

**UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS**

PANASONIC CORPORATION,

Plaintiff,

v.

MAGNA INTERNATIONAL, INC.,

Defendant.

C.A. No. 21-cv-00319

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Panasonic Corporation (“Panasonic” or “Plaintiff”) brings this action for patent infringement against Defendant Magna International, Inc., (“Defendant” or “Magna”) as follows:

NATURE OF THE ACTION

1. Panasonic is a worldwide leader in the development of diverse electronics technologies and solutions including in the automotive sector.¹ Panasonic has invested billions in research and development in the U.S. and throughout the world to advance technology in the automotive sector. This R&D has contributed to the overall value and commercial success of Panasonic’s products.² Panasonic is a leading supplier of advanced driving support systems (ADAS), in-vehicle infotainment (IVI) and heads-up display (HUD) systems. These products are designed to enhance safety, reduce driver burden and increase comfort during travel. These Panasonic automotive solutions are used by some of the world’s largest automotive manufacturers (“Original Equipment Manufacturers” or “OEMs”). For example, Panasonic ADAS solutions are

¹ See, e.g., Panasonic 2020 Annual Report, available at https://www.panasonic.com/global/corporate/ir/pdf/annual/2020/pana_ar2020e.pdf

² See Panasonic’s 2020 Annual Report, at 19-20.

found in vehicles manufactured by Honda, Toyota, General Motors and Volkswagen AG and their family of brands, among others; Panasonic IVI solutions are used by Honda, Ford, Fiat Chrysler (“FCA”) and Daimler AG, among others; and Panasonic batteries are used in Toyota and Tesla vehicles. FCA named Panasonic a winner of its “Innovation Supplier of the Year” in 2020 for Panasonic’s exceptional commitment in providing innovative and quality products and services.³

2. On information and belief, Defendant Magna, founded in 1957, manufactures, uses, offers to sell, sells, imports, sells for importation into the United States, and sells after importation into the United States certain ADAS products, and components thereof. Magna ADAS products include without authorization many technologies developed by Panasonic and protected by patents owned by Panasonic. For example, Magna markets to automotive OEMs surround view camera systems that stitch signals from multiple cameras into one single picture to show the vehicle from a bird’s-eye view⁴; camera-based guidance systems for trailer hitch alignment⁵; and a modular and scalable radar solution for providing horizontal and vertical detection with the ability to discriminate adjacent targets.⁶

3. This action seeks to prevent Magna’s continued misappropriation and use of certain of Panasonic’s patented innovations, and to compensate Panasonic for Magna’s past repeated acts of infringement. Specifically, Magna has infringed, continues to infringe, contributes to the infringement of, and induces the infringement by others of at least one claim of each U.S. Patent

³ <https://apnews.com/press-release/pr-newswire/technology-business-corporate-news-north-america-products-and-services-3c495fe9c0b80197e9a75602871bc111>

⁴ <https://www.magna.com/products/power-vision/advanced-driving-assistance-technologies>

⁵ <https://www.magna.com/innovation/driven-people-driving-change/article/taking-towing-to-the-next-level-with-a-magna-innovation>

⁶ <https://www.magna.com/products/power-vision/adas-automated-driving/product/scalable-products>

Nos. 6,912,001 (“the ‘001 Patent”), 6,970,184 (“the ‘184 Patent”), and 10,615,516 (“the ‘516 Patent”) and 10,673,149 (“the ‘149 Patent”) (collectively, the “Asserted Patents”) under the patent laws of the United States, 35 U.S.C. § 100, *et seq.* arising from Magna’s and/or its customers’ manufacture, use, sale, offer for sale in and/or importation into the United States of certain ADAS products.

PARTIES

4. Panasonic is a Japanese corporation with its principal place of business located at 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8501, Japan.

5. On information and belief, Magna is a Canadian corporation organized under the laws of the Province of Ontario, Canada and has its principal place of business at 337 Magna Drive, Aurora, Ontario Canada L4G 7K1.

JURISDICTION AND VENUE

6. This is a civil action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, including 35 U.S.C. § 271, which gives rise to the remedies specified under 35 U.S.C. §§ 281 and 283-285.

7. This Court has exclusive subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

8. This Court has personal jurisdiction over Magna. On information and belief, Magna has engaged in, and continues to engage in, co-development of a radar on chip product with Uhnder, Inc. in Austin, Texas for use in at least Magna’s ICON Radar product. In particular, Magna is engaged in engineering and product development activities with Uhnder to bring this

ICON RADAR product to market. Ex. 5

(<https://www.magna.com/company/newsroom/releases/release/2018/01/16/news-release---magna-unveils-high-definition-icon-radar---scans-environment-in-four-dimensions>). In addition

to collaborating with Uhnder, on information and belief, Magna has also invested in Uhnder in support of securing development of its ICON RADAR product. Ex. 6

(https://news.crunchbase.com/news/austins-uhnder-raises-45m-series-c/?utm_source=cb_daily&utm_medium=email&utm_campaign=20201214&utm_content=intro&utm_term=content). On information and belief, Magna has provided samples of its ICON Radar product to OEMs for evaluation, use and testing. Ex. 7 (<https://www.magna.com/blog/post/tech-tutorial-magnas-icon-radar>).

9. Magna's collaboration with, and financial interest in, Uhnder in this District is directed to products that infringe one or more claims of the Asserted Patents. In January 2021, Uhnder itself indicated it is "working closely with our partner Magna International" (<https://www.linkedin.com/company/uhnder/posts/?feedView=all>). Moreover, in January 2021, Magna and Uhnder announced that they would be working to support development of an ADAS system for inclusion in Fisker Inc.'s Ocean SUV, expected to launch in 2022. Ex. 8 (<https://www.autonews.com/suppliers/magna-develop-driver-assistance-technology-fisker>).

10. On information and belief, as part of its collaboration with Uhnder, Magna has engaged in design, testing and/or other use of its ICON RADAR product in this District, or otherwise engaged its co-developer, Uhnder, to do so on Magna's behalf, purposely availing itself of this Court's jurisdiction. Furthermore, Magna's activities, and those carried out by Uhnder at its direction, have been performed for the purpose of establishing distribution channels for Magna's ICON RADAR products, or necessary components thereof, knowing or understanding that such products would be sold and used in the United States, including in this District. As such, on information and belief, Magna employees are engaged in, or are causing others to engage in for

Magna's benefit, activities that result in infringement of one or more claims of one or more Asserted Patents.

11. In addition to its co-development activities in this District, Magna has also sold and/or supplied (and continues to sell and supply) other ADAS products, including automotive camera systems, to OEMs, such as Ford, knowing and intending that such OEM's incorporate these products into vehicles offered for sale, sold and/or used in this District. For example, on information and belief, Magna ADAS products are incorporated into the Ford F-150 vehicle, which is the highest selling vehicle in Texas (and, in this District). *See, e.g., Ex. 9* (<https://www.edmunds.com/most-popular-cars/>). On information and belief, Magna has derived substantial revenues from infringing acts in this District, including from the sale and use of infringing products incorporating the Magna ADAS products and corresponding repair parts.

12. Panasonic's causes of action arise from, at least in part, Defendant's business activities in this District and Defendant's contacts with the State of Texas and this District. Upon information and belief, Defendants have committed acts of infringement within the State of Texas and this District by, *inter alia*, directly and/or indirectly making, using, offering to sell and/or selling products that infringe one or more claims of Panasonic's patents.

13. Thus, this Court has specific personal jurisdiction over Defendant.

14. Defendant has knowingly performed these acts within this District, or knowingly caused others to perform acts in this District, giving rise to this action and has thus establishing sufficient minimum contacts with the State of Texas and this District such that the exercise of personal jurisdiction over Defendant in this case would not offend traditional notions of fair play and substantial justice.

15. Venue is proper in this judicial district under 28 U.S.C. §§ 1391 and 1400(b) because, *inter alia*, Magna is a foreign corporation organized and existing under the laws of the Province of Ontario and over which this Court has personal jurisdiction.

FACTUAL BACKGROUND

Technology Overview

16. The technology at issue relates to advanced driver-assistance systems (ADAS) technologies. ADAS systems are generally classified as those that assist driving and parking functions, and can include or incorporate camera systems, radar systems, and/or electronic control units, among others, for use with the same. ADAS systems can use one or more cameras, and image processing chips to receive the images from the cameras, process them, and display an image or information to a driver in a way that helps enhance car and road safety, as well as increase convenience.

17. For example, by gathering information from multiple cameras, as well as sensors, current ADAS systems can eliminate vehicle blind spots and/or alert a driver to nearby obstacles, such as pedestrians, that may not otherwise be easily detected by a driver. Automotive solutions employing such multi-camera systems can provide a surround image created by stitching together individual images from each of these cameras. This surround image can be used to assist drivers in parking and can be used as part of an automatic emergency braking system. A drawback of stitching a surround image from multiple cameras is that when one camera is displaced, or malfunctioning, the resulting surround image may be distorted or inaccurate. To address this drawback it is desirable to alert the user, for example when a movable part of the vehicle (door, mirror, etc) has altered the position or direction of at least one of the cameras. *See e.g.* Ex. 1 at Abstract.

18. Cameras can also be used to guide a driver in operations that would otherwise be difficult to perform alone. For example, rearview cameras can be wide-angle cameras, providing a greater field of vision to detect obstacles when backing up. A drawback of such rearview cameras is that the rearview image seen by the driver is distorted, making it more difficult to accurately assess relative positions of objects, such as when a driver is attempting to connect a trailer to an attached vehicle hitch. To address this drawback it is desirable to provide the user with a frame of reference, for example, a centerline extending from the hitch of the vehicle, for ease of connection to the trailer. *See, e.g.*, Ex. 2 at 1:6-38.

19. The efficacy of cameras can also be reduced by obstructions or adverse weather conditions (e.g., fog, rain or snow). To address these camera drawbacks, detecting and tracking objects, such as pedestrians or obstacles, can also be implemented through use or assistance from radar systems. The accuracy of many ADAS systems depends in part on the ability of radar systems, for example, to quickly and accurately gather information and identify objects or people for the driver. Next generation radar systems, such as those disclosed in certain of the Asserted Patents, provide improved three-dimensional, nearfield object detection. Such systems are also able to detect objects in low visibility environments, such as in fog, snow, dust and/or darkness—environments in which use of camera and/or LIDAR systems are, at best, difficult. Furthermore, because they are smaller than prior generation systems, next generation radar can be incorporated into smaller packaging, allowing for easier and less costly installation.

20. The three-dimensional radar market is in its infancy, and is expected to experience steep growth over the next 6 years and beyond. For example, the global radar market was valued at \$32.56 billion in 2019, and has been projected to reach \$49.43 billion by 2027. *See* Ex. 10 (<https://www.alliedmarketresearch.com/radar-market>). Specifically, the three-dimensional radar

market (not limited to automotive products) was valued at \$926 million in 2020 and is expected to reach \$2.59 billion by 2026. *See* Ex. 11 (<https://www.mordorintelligence.com/industry-reports/3d-radar-market>). More importantly, automotive radar has been identified as an “emerging [] key technology enabling intelligent and autonomous features in modern vehicles,” and “a critical sensor system in autonomous driving assistance systems (ADAS).” Ex. 12 (<https://www.sciencedirect.com/topics/engineering/automotive-radar>).

21. The automotive radar industry is experiencing a major transformation and is about to enter a commercial era. *See e.g.* Ex. 13 (https://www.i-micronews.com/products/status-of-the-radar-industry-players-applications-and-technology-trends-2020/?utm_source=PR&utm_medium=email&utm_campaign=PR-%20Radar_%20MarketUpdate_YOLE_May2020). While the radar industry is already a large, mature market, the increase in demand for high-end passenger cars, rise in concerns about vehicle and driver safety, and implementation of increasingly stringent safety regulations, has the automotive section of the radar industry primed for significant growth. *Id.*

22. The timing now is therefore critical for suppliers of products in this sector to obtain initial contracts, build relationships, and establish their products as the benchmark for others in this sector, amongst other reasons. For at least these reasons, Panasonic is uniquely and irreparably harmed by others’ use of its inventive technologies.

23. OEMs are looking for radar devices capable of more accurately describing the scene in front of and around the car, and capable of processing more and more data on the fly to improve perception of the car’s surroundings, while cost issues continue to matter particularly in automotive applications. *See e.g.* Ex. 14 at 2

(http://www.yole.fr/iso_upload/News/2020/PR STATUS OF THE RADAR INDUSTRY YOLE GROUP May2020.pdf).

24. Three-dimensional radar systems, such as those taught by certain of the Asserted Patents, provide higher angular and range resolution relative to two-dimensional systems. Unlike two-dimensional radar systems, three-dimensional systems can detect target height. As a result, when paired with appropriate detection algorithms, these three-dimensional systems can be used for improved pedestrian and animal detection (including under low visibility or at night) and space detection in complex autonomous parking environments. Three-dimensional radar systems also remain much cheaper than alternative LIDAR sensors used, for example, in autonomous vehicles. In view of these benefits, Panasonic's patented three-dimensional radar systems provide a substantial bridge for implementation and use of autonomous vehicles in the marketplace.

Panasonic

25. Over the more than 100 years of its existence, Panasonic has had a long history of innovation and technological accomplishments.⁷ Dating back to its first product—an attachment plug that could be used to connect electric products to the only available source of electricity in a household, a single light socket, that is still sold today almost 100 years later—Panasonic has focused on the development of innovative products that are both cost-effective and improve consumers' lives.

26. Building on its history of innovation, Panasonic has become a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, and B2B areas. Panasonic's focus today is in five main business

⁷ Panasonic's 2020 Annual Report, at 5-6, available at https://www.panasonic.com/global/corporate/ir/pdf/annual/2020/pana_ar2020e.pdf.

units: appliances; life solutions; connected solutions; automotive; and industrial solutions. Panasonic has invested billions in research and development in the U.S. and throughout the world in support of these business units. In 2020 alone, Panasonic spent \$4.47 billion on R&D. *See Ex. 31.* Panasonic's R&D has contributed to the overall value and commercial success of Panasonic's products.⁸

27. Panasonic has been recognized as one of the world's top automotive suppliers.⁹ Panasonic is the global leader in development, manufacture and sale of batteries for electric vehicles (EV).¹⁰ Panasonic is also a leading supplier of ADAS systems, in-vehicle infotainment (IVI) and heads-up display (HUD) systems, which are designed to enhance safety and comfort during travel and to reduce driver burden. Panasonic automotive solutions are used by some of the world's largest automotive manufacturers, such as Honda, Toyota, General Motors and Volkswagen AG (and their family of brands), among others. And FCA has been recognized by Panasonic as a winner of its "Innovation Supplier of the Year" in 2020 for Panasonic's exceptional commitment in providing innovative and quality products and services.¹¹

Magna

28. On information and belief, Defendant Magna manufactures, uses, offers to sell, sells in, and imports into, the United States a number of ADAS products. For example, Magna markets to automotive OEMs a number of ADAS-related solutions, including: surround view

⁸ See e.g. Panasonic's 2020 Annual Report, at 19-20, available at https://www.panasonic.com/global/corporate/ir/pdf/annual/2020/pana_ar2020e.pdf.

⁹ <https://na.panasonic.com/us/automotive-solutions>; <https://www.prnewswire.com/news-releases/panasonic-automotive-honored-by-fca-as-2020-supplier-of-the-year-301159614.html>

¹⁰ <https://na.panasonic.com/us/automotive-solutions>

¹¹ <https://apnews.com/press-release/pr-newswire/technology-business-corporate-news-north-america-products-and-services-3c495fe9c0b80197e9a75602871bc111>

camera systems¹²; camera-based trailer hitch alignment systems¹³; and a modular and scalable radar solution for providing horizontal and vertical detection with the ability to discriminate adjacent targets.¹⁴

MAGNA'S ACCUSED PRODUCTS

29. Magna makes, uses, offers to sell, and/or sells in, or imports into or sells for importation into, the United States certain ADAS camera and radar products (collectively, the “Accused Products”).

30. In particular, Magna makes, uses, offers to sell, and/or sells in, and imports into or sells for importation into, the United States certain ADAS camera products, and components thereof (collectively, the “Accused Camera Products”), including, but are not limited to, camera systems, including those supporting backup guidelines for connecting a hitch to a trailer and 360° surround camera views. *See, e.g.,* <https://www.magna.com/products/power-vision/advanced-driving-assistance-technologies>. The Accused Camera Products include, but are not limited to, image processing modules and camera modules capable of capturing images, synthesizing images and generating for display these synthesized images. *See, e.g.,* Ex. 15 (<https://www.magna.com/products/power-vision/advanced-driving-assistance-technologies>). For example, the Accused Camera Products provide vehicle surround view capabilities by synthesizing images from multiple cameras. *See, e.g.,* <https://www.youtube.com/watch?v=hkPZR8h88eQ>. As another example, the Accused Camera Products provide backup assistance technology, including

¹² <https://www.magna.com/products/power-vision/advanced-driving-assistance-technologies>

¹³ <https://www.magna.com/innovation/driven-people-driving-change/article/taking-towing-to-the-next-level-with-a-magna-innovation>

¹⁴ <https://www.magna.com/products/power-vision/adas-automated-driving/product/scalable-products>

the incorporation of a hitch centerline in a displayed backup camera image, for use in assisting connection of a trailer to a vehicle hitch. *See, e.g.*, <https://www.youtube.com/watch?v=xtMCvXxH15o>; *see also, e.g.*, <https://www.youtube.com/watch?v=JgPTe-ZM9sk>.

31. On information and belief, the Accused Camera Products are sold by Magna to, for example, Ford, for inclusion in the 2020 Model Year Ford F-150 vehicle, among others. *See, e.g.*, Ex. 16 (https://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2020-Ford-F-150-Owners-Manual-version-1_om-EN-US_08_2019.pdf); Ex. 17 (<https://www.ford.com/trucks/f150/2020/features/smart/>); Ex. 18 (<https://www.magna.com/products/power-vision/product/surroundview>); Ex. 19 (<https://www.magna.com/products/power-vision/product/domain-controller>).

32. Magna also makes, uses, offers to sell and/or sells in, and imports into or sells for importation into, the United States certain radar products or components thereof (collectively the “Accused Radar Products”), including, but not limited to, those having forward- and rear-facing radar functionality. *See, e.g.*, Ex. 20 (<https://www.microwavejournal.com/blogs/9-pat-hindle-mwj-editor/post/31931-uhnder-emerges-with-highly-integrated-automotive-radar-soc>). On

information and belief, further evidence of the design and operation of the Accused Radar can be found at: <https://www.uhnder.com/>; *see also* Ex. 7 (<https://www.youtube.com/watch?v=G9T6x1rz0eA&feature=youtu.be>); Ex. 5 (<https://www.magna.com/blog/post/tech-tutorial-magnas-icon-radar>); Ex. 21 (<https://www.magna.com/company/newsroom/releases/release/2018/01/16/news-release---magna-unveils-high-definition-icon-radar---scans-environment-in-four-dimensions>); Ex. 21 (<https://www.magna.com/docs/default-source/2018-press-releases/magna-naias-icon-radar-final>

[release-for-dist.pdf?sfvrsn=a5d53c77_2](https://www.microwavejournal.com/articles/32668-digital-code-modulation-mimo-radar-improves-automotive-safety?v=preview)); Ex. 22 (https://www.uhnder.com/images/data/UHNDER_ISSCC_Paper.pdf); Ex. 23 (www.uhnder.com/images/data/UHNDER_ISSCC_Paper.pdf); Ex. 24 (*A package co-design Methodology for mm-Wave System-on-Chip Transistors*, Vito Giannini et al. (Uhnder), European Microwave Week 2017).

33. Upon information and belief, Magna makes, uses, offers to sell, and/or sells in, and imports into or sells for importation into, the United States, the Accused Radar Products for use as part of a vehicle ADAS system. The Accused Radar Products incorporate a system on a chip developed by Magna and Uhnder for use in these products. Magna collaborated with Uhnder to deploy ICON RADAR, which, on information and belief, Magna evaluates and tests, and is being evaluated and tested by others, in the United States. *See, e.g.*, <https://www.uhnder.com/>; Ex. 21 (https://www.uhnder.com/images/data/Magna_NAIAS_iCON_Radar_FINAL_RELEASE_FOR_DIST.pdf); Ex. 8 (<https://www.autonews.com/suppliers/magna-develop-driver-assistance-technology-fisker>).

FIRST CAUSE OF ACTION
(Patent Infringement of the '001 Patent)

34. Plaintiff realleges and incorporates all the foregoing paragraphs as though fully set forth herein.

35. On June 28, 2005, the PTO duly and legally issued U.S. Patent No. 6,912,001, entitled “Image processor and monitoring system.” Shusaku Okamoto, Masamichi Nakagawa, Hirofumi Ishii, Kunio Nobori, and Atsushi Morimura are the named inventors. The date of the earliest application to which the '001 Patent claims priority is May 26, 2000, and the patent is set to expire on June 8, 2023. A true and accurate copy of the '001 Patent is attached hereto as Exhibit 1.

36. Panasonic is the owner of all right, title, and interest in the '001 Patent, including the right to bring this suit for past and future damages and/or injunctive relief.

37. The '001 Patent is valid and enforceable.

38. The '001 Patent claims are directed to a patent-eligible, non-abstract idea. The claimed inventions are directed to a combination of physical hardware structures and a specific technical improvement to the way such combination of hardware structures operate, including specific claimed structures and configurations of an image processor (claim 1) and of a monitoring system with multiple cameras, a display device and an image processing section (claim 11), that provides enhanced driving assistance to an end-user.

39. As set forth in the '001 Patent, past imaging systems using vehicle-mounted cameras “normally carry out the image processing on the supposition that each camera once mounted should be unable to change its position or the direction it faces.” '001 Patent at 1:22-25. The '001 Patent recognizes that “[t]his is because it is practically impossible, or at least extremely difficult, to process multiple images for a synthesized image in real time with the continuously changing positions and directions of the cameras taken into account,” because “it takes too much time to perform that complicated processing and that the size and ability of such a system are limited.” *Id.* at 1:25-33. The '001 Patent also recognizes several problems that arise because “it is highly probable that those cameras for use in such a monitoring system are mounted on various movable parts of the vehicle.” *Id.* at 1:33-38. First, when any of the movable vehicle parts moves, “the image taken by that camera is affected by the change to possibly misalign the image that forms an integral part of the resultant synthesized image.” *Id.* at 1:40-45. This results in “only a portion of the synthesized image, corresponding to the image taken by the camera in question, misaligns, thus making the image on the screen unnatural to the viewer.” *Id.* at 1:48-51. This

issue also exists even if one of the cameras are mounted to a fixed part of the vehicle. *Id.* at 1:52-58.

40. The '001 Patent provides a number of solutions to these problems, improving vehicle image synthesizing and associated systems by, for example, providing a novel image processor and pixel synthesizer to generate a synthesized image from multiple images and outputs of vehicle-mounted cameras by switching display modes in accordance with a state of a movable part of the vehicle. *Id.* at 1:66-2:23; *see id.* at 1:6-3:15. For example, the claimed inventions include an image processor comprising an image processing section, which receives multiple images that have been taken by cameras mounted on a vehicle to monitor surroundings of the vehicle, generates a synthesized image from the multiple images and outputs the synthesized image to a display device. *Id.* at claim 1. The claimed inventions further recite that the image processing section switches display modes of the synthesized image in accordance with a state of a movable part of the vehicle. *Id.* The claimed inventions also recite that if a change in the state of the movable part has altered the position or direction of at least one of the cameras to make the synthesized image unnatural, the image processing section switches the display modes of the synthesized image from a normal mode into an alert mode. *Id.*; *see id.* at claims 6, 11, and 12. The inventions, as illustrated in claims 1, 6, 11, and 12 for example, improve the functioning of a vehicular image synthesis system by, for example, providing a specific manner of displaying a limited set of information in vehicle display interfaces that overcomes unnatural display issues in prior display systems.

41. Various aspects of claimed inventions of the '001 Patent also support generating a synthesized image without using the image taken by the camera that has had the position or direction thereof changed. *Id.* at claim 2. In some cases, the image processing section determines

not to output the synthesized image, for example, to avoid displaying unnatural views to vehicle occupants. *Id.* at claim 3. In other cases, when operating in alert mode, the image processing section outputs an alert message instead of, or along with, the synthesized image. *Id.* at claim 4. Additionally, various aspects of the invention further support switching display modes of the synthesized image in accordance with opening and closing one or more of the doors, hood, or trunk of the vehicle. *Id.* at claim 5.

42. During prosecution, the inventors of the '001 Patent clarified that the invention was directed to a specific image processor comprising an image processing section, which receives multiple images that have been taken by cameras mounted on a vehicle to monitor surroundings of the vehicle and generates a synthesized image from the multiple images and outputs the synthesized image to a display device. *See* Amendment and Reply Under 37 C.F.R. 1.111, July 29, 2004. The inventors further clarified that the invention was directed to an image processing section that switches display modes of the synthesized image in accordance with a state of a movable part of a vehicle. *Id.*

43. Defendant has infringed, and continues to infringe, literally or under the doctrine of equivalents, the '001 Patent by making, using, offering for sale and/or selling in, or importing and/or selling for importation into, the United States Accused Camera Products that practice at least claim 1 and 11 of the '001 Patent in violation of 35 U.S.C. §§ 271(a), (b), and (c). Such Accused Camera Products include the Magna surround camera system incorporated into, for example, one or more model years of Ford F-150. The Accused Camera Products are non-limiting examples identified based on publicly available information, and Panasonic reserves the right to identify additional infringing activities, products, and services on the basis of information obtained, for example, during discovery.

44. Magna has had knowledge of the '001 Patent since at least Winter 2010. On December 2, 2010, Tetsuyuki Watanabe, Director of the Licensing Center with the Intellectual Property Rights Operations Company of Panasonic Corp., sent a letter to Dr. Niall Lynam, Chief Technical Officer of Magna Electronics, Inc., identifying that Panasonic had developed many technologies for use in vehicles that relate to image manipulation, graphic overlays, lens detectors, and camera devices. *See* Ex. 25. In Appendix A of Exhibit 25, the '001 Patent is identified as one of 23 patents related to image synthesis. *Id.* On information and belief, Magna Electronics is a wholly owned subsidiary of Magna. *See, e.g.*, Ex. 26 and Ex. 27. In view of the specific identification of the '001 Patent and the clear language of its claims, Magna has known that customers, distributors, suppliers, and other purchasers of the Accused Camera Products are infringing one or more claims of the '001 Patent, or has otherwise been being willfully blind to its customers, distributors, suppliers, and other purchasers of the Accused Camera Products infringing one or more claims of the '001 Patent. Furthermore, on information and belief, Magna has instructed these customers, distributors, suppliers, and other purchasers to use the Accused Camera Products in a manner that infringes one or more claims of the '001 Patent knowing use of the Accused Camera Products in the instructed manner to infringe such claims. *See e.g.* Ex. 28 (<https://www.prnewswire.com/news-releases/advanced-technologies-from-magna-contribute-to-the-new-maserati-levante-615679013.html>) (describing that the Magna Eyeris system provides a “bird’s eye view” with “integrated ‘door open’ warning display”).

45. In addition to being notified of the '001 Patent directly by Panasonic in December 2010, another Magna subsidiary, Magna Mirrors of America, Inc.¹⁵ identified the '001 Patent in

¹⁵ Magna Mirrors, Inc. is also, upon information and belief, a wholly-owned subsidiary of Magna. *See* Ex. 29 at 45 (available at https://www.magna.com/docs/default-source/financial-reports-public-filings/annual-information-forms/aif_aoda.pdf?sfvrsn=9ed915d_12)

an Information Disclosure Statement submitted to the Patent Office during prosecution of a patent application that ultimately issued as U.S. Patent 8,508,383. Again, by identifying the '001 Patent as prior art potentially relevant to the patentability of U.S. Patent 8,508,383, Magna had knowledge of the '001 Patent and the relevance of its asserted claims to Magna's Accused Camera Products.

46. The Accused Camera Products meet all the limitations of at least claim 1 of the '001 Patent in violation of 35 U.S.C. § 271(a).

47. On information and belief, the Accused Camera Products comprise an image processor comprising an image processing section, which receives multiple images that have been taken by cameras mounted on a vehicle to monitor surroundings of the vehicle, as seen below.



See, e.g., <https://www.youtube.com/watch?v=hkPZR8h88eQ> (showing multiple cameras located at the front, rear and side of the vehicles);

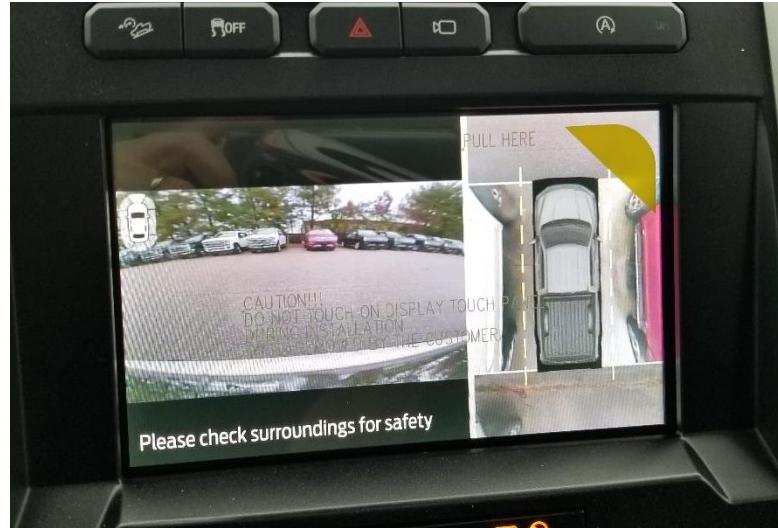


A 3D, 360° VIEW OF THE ENVIRONMENT

Magna's camera signals are processed and stitched into one single picture to show the vehicle from a bird's-eye view. By providing drivers with a seamless 360° view of the vehicle and surrounding environment, vehicle safety and driver and passenger security are enhanced. Viewpoints can be chosen freely in 3D and can be programmable, allowing an overlay of a 3D rendered-vehicle.

See also <https://www.magna.com/products/power-vision/product/surroundview>. Additional examples are provided below in relation to the 2020 Ford F-150, which incorporates the Magna Accused Camera Products. See, e.g., Ex. 16, at 249, 252-253 (showing multiple cameras mounted on the F-150).

48. On information and belief, the image processor of the Accused Camera Products can be used to synthesize a 360° degree (or surround) view image from the images taken by the multiple cameras, as shown below:



Ex. 30.

49. On information and belief, the image processor for the Accused Camera Products outputs the generated synthesized image to a display device:



See, e.g., Ex. 30 (a picture of the synthesized image created by the image processor and side of the vehicles); and Ex. 16 at pp 249, 252-253.

50. On information and belief, the image processing section of the Accused Camera Products switches display modes of the synthesized image in accordance with a state of a movable

part of the vehicle, such that if a position or orientation of the movable part is altered and the corresponding position or direction of at least one of the cameras correspondingly changes such that the synthesized image becomes unnatural, the image processing section switches the display modes of the synthesized image from a normal mode into an alert mode. Examples of the normal mode and alert mode in the 2020 Model Year Ford F-150 are shown below:



**Normal mode
(door closed)**



**Alert mode
(door open)**

See, e.g., Ex. 30 (pictures of the synthesized image created by the image processor and displayed by the F-150 vehicle).

51. In addition to directly infringing the '001 Patent, Defendant has infringed and continues to infringe the '001 Patent indirectly, including by actively inducing others to directly infringe, for example, claims 1 and 11 of the '001 Patent in violation of 35 U.S.C. § 271(b) or contributing to the infringement by others of, for example, claims 1 and 11 of the '001 Patent in violation of 35 U.S.C. § 271(c).

52. Despite Defendant's knowledge of the '001 Patent, Defendant has actively induced and continues to actively induce others to make, use, sell, and/or offer to sell in the United States,

and/or import into the United States, Accused Camera Products with knowledge that such activities practice every element of one or more claims of the '001 Patent, or being willfully blind to such activities practicing every element of one or more claims of the '001 Patent.

53. For example, in addition to Defendant's own direct infringement of the '001 Patent, Defendant's customers, including automotive OEMs, on information and belief, are directly infringing the '001 Patent through their installation and use of Accused Camera Products that are covered by one or more claims of the '001 Patent, including, for example, the Magna surround view camera system incorporated into one or more vehicles made, used, sold or offered for sale in the United States, such as the 2020 MY Ford F-150.

54. On information and belief, Defendant knowingly induces such infringement of the '001 Patent and has done so with specific intent to induce such infringement, including through activities relating to marketing, advertising, promotion, support, and distribution of the Accused Camera Products, including the Magna surround view camera system products.

55. On information and belief, Defendant provides materials that instruct its customers on how to use the Accused Camera Products, such as Magna surround view camera system products, with the intent that such customers infringe one or more claims of the '001 Patent. On information and belief, Defendant further provides instructions to its customers for installation and troubleshooting of the Magna surround view camera system products, which inform its customers on how to use Defendant's Accused Camera Products, with the same intent.

56. This description is based on publicly available information and a reasonable investigation of the structure and operation of the Accused Camera Products. Panasonic reserves the right to modify this description, including, for example, on the basis of information about the Accused Camera Products that it obtains during discovery.

57. Unless and until enjoined by this Court, Defendant will continue to infringe the '001 Patent, both directly and indirectly. Defendant's infringement is causing and will continue to cause Plaintiff irreparable harm, for which there is no adequate remedy at law.

58. Under 35 U.S.C. § 283, Plaintiff is entitled to a permanent injunction against further infringement.

59. Under 35 U.S.C. § 284, Plaintiff is entitled to damages adequate to compensate it for Defendant's infringement, in no event less than a reasonable royalty for Defendant's use of the inventions of the '001 Patent, together with interest and costs as fixed by the court.

SECOND CAUSE OF ACTION
(Patent Infringement of the '184 Patent)

60. Plaintiff realleges and incorporates all the foregoing paragraphs as though fully set forth herein.

61. On November 29, 2005, the PTO duly and legally issued U.S. Patent No. 6,970,184, entitled "Image display method and apparatus for rearview systems." Yuichi Hirama, Satoru Masuda, Hidetoshi Mimura, Kazuki Miyama, and Masahiro Takata are the named inventors. The date of the earliest application to which the '184 Patent claims priority is March 19, 2002, and the patent is set to expire on October 1, 2023. A true and accurate copy of the '184 Patent is attached hereto as Exhibit 2.

62. Panasonic is the owner of all right, title, and interest in the '184 Patent, including the right to bring this suit for past and future damages and/or injunctive relief.

63. The '184 Patent is valid and enforceable.

64. The '184 Patent claims are directed to a patent-eligible, non-abstract idea. The claimed inventions are directed to a combination of physical hardware structures and a specific technical improvement to the way such combination of hardware structures operate, including

specific claimed structures and configurations of a rearview camera device that provides driving assistance for an end-user.

65. As set forth in the '184 Patent, even with use of a rearview camera mounted on a vehicle, "it is difficult to couple a hitch with a trailer," especially when the driver is alone. Ex. 2 at 1:23-31. The '184 Patent further recognizes that "[i]t is quite difficult for a driver to accurately back the vehicle so that the hitch mounted in a blind spot from the driver may engage the coupling member on the trailer." *Id.* at 1:26-28. As a result, the '184 Patent notes that "it requires a considerable skill for a driver alone to accurately back the vehicle and perform coupling work while watching the image from the rearview camera." *Id.* at 1:36-38.

66. The '184 Patent provides a number of solutions to these problems, improving vehicle imaging and associated systems by, for example, "providing an image display method for a rearview camera for displaying an image shot by a rearview camera mounted on a vehicle on a screen that can be viewed from a driver's seat, wherein the method superimposes an auxiliary line image indicating the straight rear direction of the vehicle on the image shot by the vehicle on the screen." *Id.* at 1:46-52. The '184 Patent describes a unique configuration such that "the auxiliary line image extends from the position of the hitch attached at the rear of the vehicle and the auxiliary line image has a distance marker," which further enables "the driver [to] recognize the distance to the hitch thus allowing more precise operation." *Id.* at 1:55-59. The '184 Patent discloses several configurations that make it possible "to prevent an auxiliary line from overlapping the rearward obstacle thus worsening the image quality" and "precisely grasp the relation with the hitch when the hitch is approached." *Id.* at 1:60-2:8.

67. For example, the '184 Patent provides a solution wherein "[a]n image display apparatus for a rearview camera for displaying an image shot by a rearview camera mounted on a

vehicle on a screen that is viewed from a driver's seat." *Id.* at claim 14. The '184 Patent further describes that the image display apparatus includes "a display unit for superimposing an auxiliary line image indicating the straight rear direction of the vehicle on the image shot by the camera on the screen," "wherein said auxiliary line image extends from the position of a hitch attached at the rear of the vehicle." *Id.*

68. Various aspects of claimed inventions of the '184 Patent also support uniquely generating an image by including, for example, a distance marker with the auxiliary line (claim 15), by hiding the portion where said auxiliary line image overlaps a rearward obstacle (claim 16), and by discriminating said auxiliary line image from other images (claim 17). The '184 Patent also describes "a converting unit for converting an image shot by said rearview camera to an image from an overhead viewpoint," and "wherein the resulting image is displayed in said screen when the distance between the vehicle and the rearward obstacle has become within a predetermined range." *Id.* at claim 19.

69. During prosecution, the inventors of the '184 Patent clarified that the invention included an "auxiliary line image [that] extends from the position of a hitch attached at the rear of the vehicle," as recited in the independent claims. *See* Amendment and Reply Under 37 C.F.R. 1.111, December 27, 2004. The inventors further clarified that the invention included other novel features, such as, for example, an auxiliary line image that has a distance marker, converting the image shot by said rearview camera to an image from an overhead viewpoint, wherein the resulting image is displayed in a screen when the distance between the vehicle and the rearward obstacle has become within a predetermined range, and wherein the image from said overhead viewpoint is displayed to be zoomed. *Id.*

70. Defendant has infringed, and continues to infringe, literally or under the doctrine of equivalents, the '184 Patent by making, using, offering for sale and/or selling in, or importing and/or selling for importation into the United States, Accused Camera Products that practice at least claims 1 and 14 of the '184 Patent in violation of 35 U.S.C. §§ 271(a), (b), and (c). Such Accused Camera Products include Magna smart camera modules, including those used in surround camera systems incorporated into, for example, one or more model years of Ford F-150s.

71. Magna has had knowledge of the '184 Patent since at least Winter 2010. On December 2, 2010, Tetsuyuki Watanabe, Director of the Licensing Center with the Intellectual Property Rights Operations Company of Panasonic Corp., sent a letter to Dr. Niall Lynam, Chief Technical Officer of Magna Electronics, Inc., identifying that Panasonic had developed many technologies for use in vehicles that relate to image manipulation, graphic overlays, lens detectors, and camera devices. *See* Ex. 25. In Appendix A to Exhibit 25, the '184 Patent is identified as one of 10 patents related to Graphic Overlay. *Id.* On information and belief, Magna Electronics is a wholly owned subsidiary of Magna. *See e.g.* Ex. 26 and Ex. 27. In view of the specific identification of the '184 Patent and the clear language of its claims, Magna has known that its customers, distributors, suppliers, and other purchasers of the Accused Camera Products are infringing one or more claims of the '184 Patent, or has otherwise been being willfully blind to its customers, distributors, suppliers, and other purchasers of the Accused Camera Products infringing one or more claims of the '184 Patent. Furthermore, on information and belief, Magna has instructed these customers, distributors, suppliers, and other purchasers to use the Accused Camera Products in a manner that infringes one or more claims of the '184 Patent knowing such use of the Accused Camera Products to infringe such claims.

72. In addition to being notified of the '184 Patent directly by Panasonic in December 2010, during prosecution of an application assigned to Magna Electronics that ultimately issued as U.S. Patent 10,144,353, the USPTO examiner identified the '184 Patent in a list of references considered on September 17, 2014, and the '184 Patent is listed on the face of U.S. Patent 10,144,353. Again, by having the '184 Patent identified as prior art potentially relevant to the patentability of U.S. Patent 10,144,353, Magna has had knowledge of the '184 Patent and the relevance of its asserted claims to Magna's Accused Camera Products.

73. The Accused Camera Products meet all the limitations of at least claim 1 of the '184 Patent in violation of 35 U.S.C. § 271(a).

74. On information and belief, Defendants perform an image display method for a rearview camera for displaying an image shot by a rearview camera mounted on a vehicle on a screen that is viewed from a driver's seat, through their own use and testing of the Accused Camera Products, including Magna's rearview camera products and/or the rear camera of a surround view camera system. *See, e.g.,* <https://www.youtube.com/watch?v=JgPTe-ZM9sk>.

75. On information and belief, Defendants' rearview camera products, and/or the rear camera of its surround view camera systems, generate for display, and in conjunction with a vehicle display operate to display an auxiliary line image indicating the straight rear direction of a vehicle superimposed on the image shot by the camera on the screen:



See, e.g., id.

76. On information and belief, Defendants' rearview camera products, and/or the rear camera of its surround view camera systems, generate for display and in conjunction with a vehicle display, operate to display on an image an auxiliary line that extends from the position of a hitch attached at the rear of the vehicle:



See, e.g., id.

77. In addition to directly infringing the '184 Patent, Defendant has infringed and continues to infringe the '184 Patent indirectly, including by actively inducing others to directly infringe, for example, claims 1 and 14 of the '184 Patent in violation of 35 U.S.C. § 271(b) or contributing to the infringement by others of, for example, claims 1 and 14 of the '184 Patent in violation of 35 U.S.C. § 271(c).

78. Defendant has also had knowledge of the '184 Patent through its citation in a June 23, 2014 Information Disclosure Statement for U.S. Patent Publication No. 2014-0267732, assigned to Magna Electronics, Inc.

79. Despite Defendant's knowledge of the '184 Patent, Defendant has actively induced and continues to actively induce others to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, with knowledge that such activities practice every element of one or more claims of the '184 Patent, or being willfully blind to such activities practicing every element of one or more claims of the '184 Patent. Such Accused Camera Products include for example the Magna rearview camera products and/or the rear camera of a surround view camera system.

80. In addition to Defendant's own direct infringement of the '184 Patent, Defendant's customers, including automotive OEMs, on information and belief, are directly infringing the '184 Patent through their use of Accused Camera Products that are covered by one or more claims of the '184 Patent, including, for example, through sale and use of vehicles incorporating the Magna rearview camera products and/or the rear camera of a surround view camera system. For example, on information and belief, Ford incorporates a Magna rearview camera and/or a surround view camera system that includes a rear camera and a display in the 2020 Model Year Ford F-150, which

is used at Defendant's direction to display an auxiliary line extending from a hitch from the back of a vehicle.

81. On information and belief, at least as of the date of this Complaint and based on the information set forth herein, Magna further contributes to the infringement of one or more claims of the '184 Patent under 35 U.S.C. § 271(c) by offering to sell, selling, and/or importing into the United States a component of the Accused Camera Products, or a material or apparatus for use in practicing a process claimed in the '184 Patent, that constitutes a material part of the inventions, knowing the same to be especially made or especially adapted for use in an infringement of the '184 Patent, and is not a staple article or commodity of commerce suitable for substantial noninfringing use. In this case, the Magna surround view system is a material part of at least the invention of claims 1 and 14 of the '184 Patent for the reasons set forth, above.

82. This description is based on publicly available information and a reasonable investigation of the structure and operation of the Accused Camera Products. Panasonic reserves the right to modify this description, including, for example, on the basis of information about the Accused Camera Products that it obtains during discovery.

83. Unless and until enjoined by this Court, Defendant will continue to infringe the '184 Patent, both directly and indirectly. Defendant's infringement is causing and will continue to cause Plaintiff irreparable harm, for which there is no adequate remedy at law.

84. Under 35 U.S.C. § 283, Plaintiff is entitled to a permanent injunction against further infringement.

85. Under 35 U.S.C. § 284, Plaintiff is entitled to damages adequate to compensate it for Defendant's infringement, in no event less than a reasonable royalty for Defendant's use of the inventions of the '184 Patent, together with interest and costs as fixed by the court.

THIRD CAUSE OF ACTION
(Patent Infringement of the '149 Patent)

86. Plaintiff realleges and incorporates all the foregoing paragraphs as though fully set forth herein.

87. On June 2, 2020, the PTO duly and legally issued U.S. Patent No. 10,673,149 entitled “Radar device.” Takaaki Kishigami and Naoya Yosoku are the named inventors. The date of the earliest application to which the '149 Patent claims priority is March 25, 2015, and the patent is set to expire on March 10, 2036. A true and accurate copy of the '149 Patent is attached hereto as Exhibit 4.

88. Panasonic is the owner of all rights, title, and interest in the '149 Patent, including the right to bring this suit for past and future damages and/or injunctive relief.

89. The '149 Patent is valid and enforceable.

90. As set forth in the '149 Patent, past radar systems included “a pulse radar device that repeatedly emits pulsed waves.” *Id.* at 1:17-18. For example, “[a] wide-angle pulse radar that detects a vehicle and a pedestrian in a wide-angle range receives a mixture of multiple reflected waves from a target (for example, a vehicle) at a short distance and a target (for example, a pedestrian) at a long distance.” *Id.* at 1:19-24. The '149 Patent recognizes that to do so “requires (1) a radar transmitter to have a configuration to transmit pulsed waves or pulse-modulated waves having an auto-correlation characteristic (hereinafter, referred to as a low range sidelobe characteristic) that achieves low range sidelobes, and (2) a radar receiver to have a configuration with a wide reception dynamic range.” *Id.* at 1:24-29. However, there are several issues with these configurations.

91. As noted by the '149 Patent, “[t]he first configuration transmits pulsed waves or modulated waves as radar waves by mechanical or electrical scanning using a directional beam of a narrow angle (beam width of a few degrees), and receives reflected waves using a narrow-angle directional beam.” *Id.* at 1:32-36. But this configuration requires “scanning needs to be performed a large number of times to obtain a high resolution, which leads to a degradation in the performance of following a fast moving target.” *Id.* at 1:36-39. The '149 Patent recognizes that the second configuration, which “uses a method (direction of arrival (DOA) estimation) of receiving reflected waves through an array antenna including multiple antennas (antenna elements), and estimating the arrival angle of the reflected waves using a signal processing algorithm based on a reception phase difference corresponding to an antenna spacing … allows the radar receiver to estimate the arrival angle even when a frequency of scanning of a transmission beam on the radar transmitter is reduced, thereby achieving a shortened scanning time and an improved following performance as compared to the first configuration.” *Id.* at 1:40-51. The '149 Patent also notes that “[i]n order to achieve a high directional gain of an array antenna, antenna elements (hereinafter, referred to as array elements) included in the array antenna are each formed of a subarray antenna including multiple antenna elements.” *Id.* at 1:66-2:3. The '149 Patent recognizes the challenges of this configuration, noting that “it is difficult to arrange the array elements at spacings smaller than the size of the array element” and that when “the dimension of the array element having a subarray antenna configuration is large, and accordingly a large spacing is needed between subarray antennas, [this] may generate a grating lobe on a directivity pattern of the array antenna.” *Id.* at 2:4-10.

92. The '149 Patent provides a number of solutions to these problems, improving radar systems by, for example, “prevent[ing] generation of an unnecessary grating lobe and achiev[ing]

a desired directivity pattern even when arranged in the subarray antenna configuration.” *Id.* at 2:14-18, 2:38-40. For example, the claimed inventions include radar transmission circuitry which, in operation, transmits a radar signal through a transmitting array antenna at a predetermined transmission period; and radar reception circuitry which, in operation, receives a reflected wave signal which is the radar signal reflected by an object through a receiving array antenna. *Id.* at claim 1. The transmitting array antenna and the receiving array antenna each include multiple subarray elements. *Id.* The subarray elements are linearly arranged in a first direction in each of the transmitting array antenna and the receiving array antenna. *Id.* Each subarray element includes multiple antenna elements. *Id.* The transmitting antennas are arranged in a grid having a first direction and a second direction orthogonal to each other, and the receiving antennas are linearly arranged in the first direction. *Id.* A receiving antenna pitch of the receiving array antenna in the first direction is different from a first transmitting antenna pitch of the transmitting array antenna in the first direction. *Id.* Further, an absolute value of a difference between the first transmitting antenna pitch of the transmitting array antenna in the first direction and the receiving antenna pitch of the receiving array antenna in the first direction is not smaller than 0.5 wavelength and not larger than 0.75 wavelength. *Id.* The ’149 Patent recognizes that these radar device configurations “can prevent generation of an unnecessary grating lobe and achieve a desired directivity pattern even in a subarray antenna configuration.” *Id.* at 2:38-40.

93. Various aspects of claimed inventions of the ’149 Patent further support improvements in grating lobe reduction and directivity. For example, in some cases the transmitting array antenna and the receiving array antenna form a virtual receiving array antenna including a plurality of virtual receiving antennas, such that the virtual receiving array antenna has a plurality of virtual receiving antenna pitches and one of the plurality of virtual receiving antenna

pitches of the virtual receiving array antenna in the first direction is not smaller than 0.5 wavelength and not larger than 0.75 wavelength. *Id.* at claim 2. In other cases, for example, the second antenna pitch of the second array antenna in the first direction is equal to or larger than 1 wavelength. *Id.* at claim 17.

94. The '149 Patent claims are directed to a patent-eligible, non-abstract idea. The claimed inventions are directed to a combination of physical hardware structures, and a specific technical improvement to the way such combination of hardware structures operate, including specific claimed structures and configurations of a radar device that provides enhanced obstacle detection and driving assistance for an end-user.

95. Defendant has infringed, and continues to infringe, literally or under the doctrine of equivalents, the '149 Patent by making, using, offering for sale and/or selling in, or importing and/or selling for importation into the United States, the Accused Radar Products that practice at least claim 1 of the '149 Patent in violation of 35 U.S.C. §§ 271(a), (b), and (c). Such Accused Radar Products include Magna's ICON radar.

96. The Accused Radar Products are non-limiting examples identified based on publicly available information, and Panasonic reserves the right to identify additional infringing activities, products, and services on the basis of information obtained, for example, during discovery.

97. By at least the filing of the Complaint, Magna has knowledge of the existence of the '149 Patent and that one or more Magna products infringe at least one claim of the '149 Patent. Based on this knowledge, Magna has known that customers, distributors, suppliers, and other purchasers of the Accused Radar Products are infringing one or more claims of the '149 Patent, and Magna has intended to have these customers, distributors, suppliers, and other purchasers

infringe one or more claims of the '149 Patent by instructing them to implement and use the Accused Radar Products in a manner that Magna knows to infringe such claims.

98. The Accused Radar Products meet all the limitations of at least claim 1 of the '149 Patent in violation of 35 U.S.C. § 271(a).

99. On information and belief, the Accused Radar Products comprise a radar device, e.g., a radar SoC developed in collaboration between Magna and Uhnder. *See e.g.* Ex. 21, reproduced below:



NEWS RELEASE

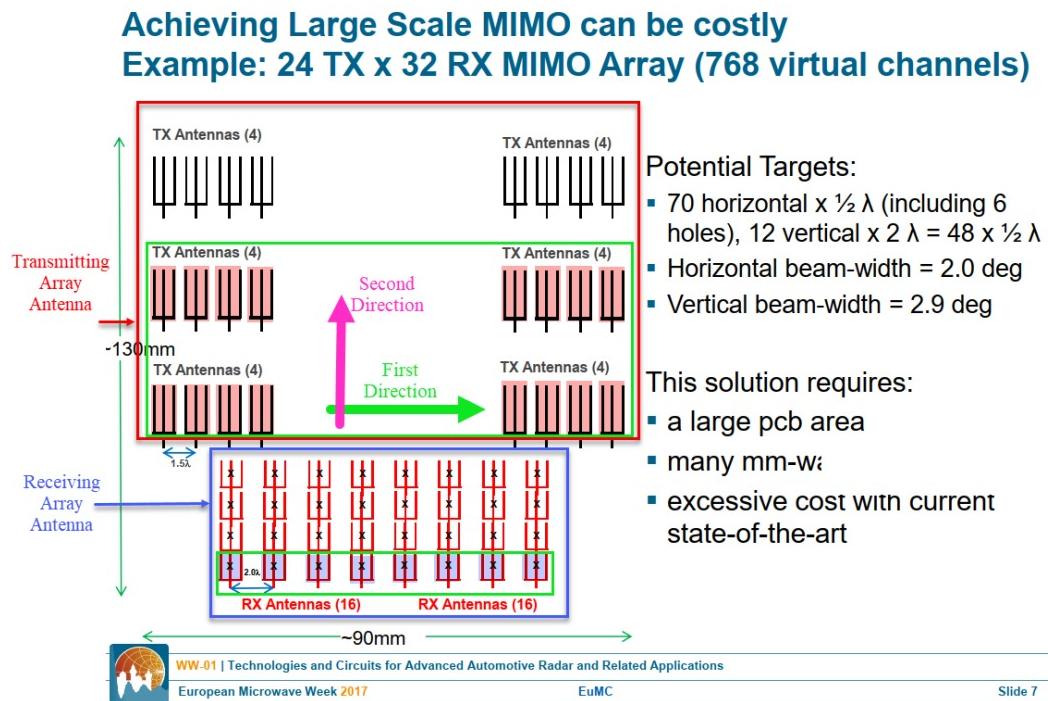
MAGNA UNVEILS HIGH-DEFINITION ICON RADAR – SCANS ENVIRONMENT IN FOUR DIMENSIONS

- Magna's ICON RADAR evolves from advanced technology used by the U.S. military
- Achieves a range of nearly 300 meters and scans the environment 50 times faster than the time it takes to blink an eye
- Next-gen radar has ultra-fine detection along with improved interference tolerance over traditional radars

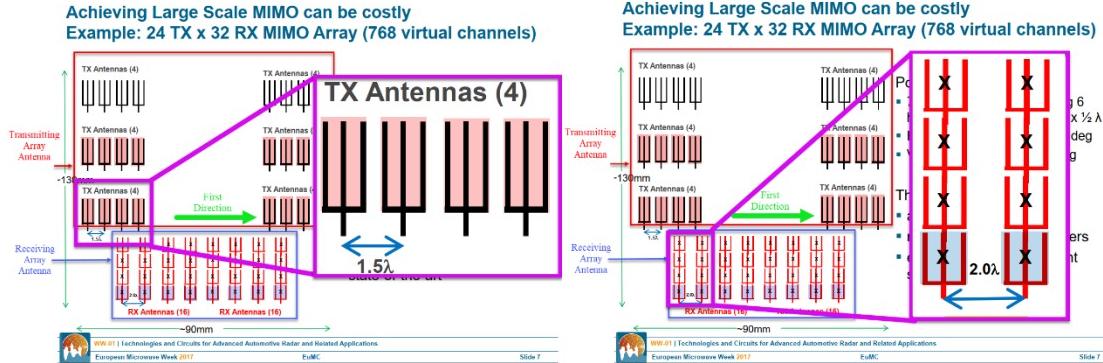
100. On information and belief, the Accused Radar Products comprise a transmitting array antenna, a receiving array antenna, radar transmission circuitry which, in operation, transmits a radar signal through the transmitting array antenna, and a radar reception circuitry which, in operation, receives a reflected wave signal through the receiving array antenna, wherein the reflected wave signal is the radar signal reflected by an object. Magna describes the Accused Radar Product as a MIMO (multiple inputs multiple outputs) radar. *See e.g.* Ex. 22

(“Uhnder’s development of digital code modulation (DCM) radar with coherent MIMO technology will be discussed, outlining its advantages compared to state-of-the-art radar technology”).

101. On information and belief, the transmitting array antenna of the Accused Radar Products includes a plurality of transmitting antennas, and the receiving array antenna includes a plurality of receiving antennas, the transmitting antennas are arranged in a grid having a first direction and a second direction orthogonal to each other, with the receiving antennas are linearly arranged in the first direction. *See, e.g.*, Ex. 24, a portion of which is reproduced below:

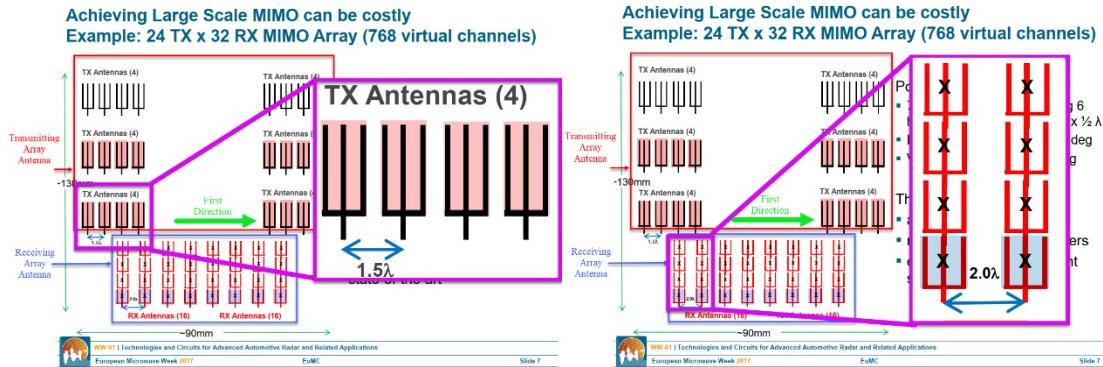


102. On information and belief, the receiving antenna pitch of the receiving array antenna of the Accused Radar Products in the first direction is different from a first transmitting antenna pitch of the transmitting array antenna in the first direction.



See, e.g., Ex. 24.

103. On information and belief, the absolute value of a difference between the first transmitting antenna pitch of the transmitting array antenna in the first direction and the receiving antenna pitch of the receiving array antenna of the Accused Radar Products in the first direction is not smaller than 0.5 wavelength and not larger than 0.75 wavelength:



See, e.g., Ex. 24.

104. In addition to directly infringing the '149 Patent, Defendant has infringed and continues to infringe the '149 Patent indirectly, including by actively inducing others to directly infringe the '149 Patent in violation of 35 U.S.C. § 271(b).

105. Defendant has had knowledge of the '149 Patent since at least the filing of this complaint. Despite Defendant's knowledge of the '149 Patent, Defendant is actively inducing and continues to actively induce others to make, use, sell, and/or offer to sell in the United States,

and/or import into the United States, Accused Radar Products with knowledge that such activities are covered by one or more claims of the '149 Patent.

106. For example, in addition to Defendant's own direct infringement of the '149 Patent, Defendant's customers, including automotive OEMs, on information and belief, are directly infringing the '149 Patent through their testing, installation and use of Accused Radar Products that are covered by one or more claims of the '149 Patent, including, for example, the ICON radar system that Magna is co-developing with Uhnder.

107. This description is based on publicly available information and a reasonable investigation of the structure and operation of the Accused Radar Products. Panasonic reserves the right to modify this description, including, for example, on the basis of information about the Accused Radar Products that it obtains during discovery.

108. Unless and until enjoined by this Court, Defendant will continue to infringe the '149 Patent, both directly and indirectly. Defendant's infringement is causing and will continue to cause Plaintiff irreparable harm, for which there is no adequate remedy at law.

109. Under 35 U.S.C. § 283, Plaintiff is entitled to a permanent injunction against further infringement.

110. If not entitled to a permanent injunction, under 35 U.S.C. § 284, Plaintiff is entitled to damages adequate to compensate it for Defendant's infringement, in no event less than a reasonable royalty for Defendant's use of the inventions of the '184 Patent, together with interest and costs as fixed by the court.

FOURTH CAUSE OF ACTION
(Patent Infringement of the '516 Patent)

111. Plaintiff realleges and incorporates all the foregoing paragraphs as though fully set forth herein.

112. On April 7, 2020, the PTO duly and legally issued U.S. Patent No. 10,615,516, entitled “Radar device.” Takaaki Kishigami and Naoya Yosoku are the named inventors. The date of the earliest application to which the ’516 Patent claims priority is March 25, 205, and the patent is set to expire on March 10, 2036. A true and accurate copy of the ’516 Patent is attached hereto as Exhibit 3.

113. Panasonic is the owner of all rights, title, and interest in the ’516 Patent, including the right to bring this suit for past and future damages and/or injunctive relief.

114. The ’516 Patent is valid and enforceable.

115. As set forth in the ’516 Patent, past radar systems included “a pulse radar device that repeatedly emits pulsed waves.” *Id.* at 1:17-18. For example, “[a] wide-angle pulse radar that detects a vehicle and a pedestrian in a wide-angle range receives a mixture of multiple reflected waves from a target (for example, a vehicle) at a short distance and a target (for example, a pedestrian) at a long distance.” *Id.* at 1:19-24. The ’516 Patent recognizes that to do so “requires (1) a radar transmitter to have a configuration to transmit pulsed waves or pulse-modulated waves having an auto-correlation characteristic (hereinafter, referred to as a low range sidelobe characteristic) that achieves low range sidelobes, and (2) a radar receiver to have a configuration with a wide reception dynamic range.” *Id.* at 1:24-29. However, there are several issues with these configurations.

116. As noted by the ’516 Patent, “[t]he first configuration transmits pulsed waves or modulated waves as radar waves by mechanical or electrical scanning using a directional beam of a narrow angle (beam width of a few degrees), and receives reflected waves using a narrow-angle directional beam.” *Id.* at 1:32-36. But this configuration requires “scanning needs to be performed a large number of times to obtain a high resolution, which leads to a degradation in the performance

of following a fast moving target.” *Id.* at 1:36-39. The ’516 recognizes that the second configuration, which “uses a method (direction of arrival (DOA) estimation) of receiving reflected waves through an array antenna including multiple antennas (antenna elements), and estimating the arrival angle of the reflected waves using a signal processing algorithm based on a reception phase difference corresponding to an antenna spacing … allows the radar receiver to estimate the arrival angle even when a frequency of scanning of a transmission beam on the radar transmitter is reduced, thereby achieving a shortened scanning time and an improved following performance as compared to the first configuration.” *Id.* at 1:40-51. The ’516 Patent also notes that “[i]n order to achieve a high directional gain of an array antenna, antenna elements (hereinafter, referred to as array elements) included in the array antenna are each formed of a subarray antenna including multiple antenna elements.” *Id.* at 1:66-2:3. The ’516 Patent recognizes the challenges of this configuration, noting that “it is difficult to arrange the array elements at spacings smaller than the size of the array element” and that when “the dimension of the array element having a subarray antenna configuration is large, and accordingly a large spacing is needed between subarray antennas, [this] may generate a grating lobe on a directivity pattern of the array antenna.” *Id.* at 2:4-10.

117. The ’516 Patent provides a number of solutions to these problems, providing a technical improvement to radar systems by, for example, “prevent generation of an unnecessary grating lobe and achieve a desired directivity pattern even when arranged in the subarray antenna configuration.” *Id.* at 2:14-18, 2:38-40. For example, the claimed inventions include radar transmission circuitry which, in operation, transmits a radar signal through a transmitting array antenna at a predetermined transmission period; and radar reception circuitry which, in operation, receives a reflected wave signal which is the radar signal reflected by an object. *Id.* at claim 1.

The transmitting array antenna and the receiving array antenna each include multiple subarray elements and are each linearly arranged in a first direction. *Id.* Further, the transmitting antenna pitch of the transmitting array antenna and the receiving antenna pitch of the receiving array antenna are both larger than 1 wavelength in the first direction. *Id.* In addition, an absolute value of a difference between the transmitting antenna pitch of the transmitting array antenna and the receiving antenna pitch of the receiving array antenna in the first direction is not smaller than 0.5 wavelength and not larger than 0.75 wavelength. *Id.* The '516 Patent recognizes where these radar device configurations “can prevent generation of an unnecessary grating lobe and achieve a desired directivity pattern even in a subarray antenna configuration.” *Id.* at 2:38-40.

118. Various aspects of claimed inventions of the '516 Patent also support improvements in grating lobe reduction and directivity. For example, in some cases the transmitting array antenna and the receiving array antenna form a virtual receiving array antenna including a plurality of virtual receiving antennas, such that the virtual receiving array antenna has a plurality of virtual receiving antenna pitches and one of the plurality of virtual receiving antenna pitches of the virtual receiving array antenna in the first direction is not smaller than 0.5 wavelength and not larger than 0.75 wavelength. *Id.* at claim 2. In other cases, for example, the transmitting antennas are further arranged in a second direction orthogonal to the first direction. *Id.* at claim 6.

119. The '516 Patent claims are directed to a patent-eligible, non-abstract idea. The claimed inventions are directed to a combination of physical hardware structures, and a specific technical improvement to the way such combination of hardware structures operate, including specific claimed structures and configurations of a radar device that provides enhanced obstacle detection and driving assistance for an end-user.

120. Defendant has infringed, and continues to infringe, literally or under the doctrine of equivalents, the '516 Patent by making, using, offering for sale and/or selling in, or importing and/or selling for importation into the United States, Accused Radar Products that practice at least claim 1 of the '516 Patent in violation of 35 U.S.C. §§ 271(a), (b), and (c). Such Accused Radar Products include the Magna ICON radar system.

121. The Accused Radar Products are non-limiting examples identified based on publicly available information, and Panasonic reserves the right to identify additional infringing activities, products, and services on the basis of information obtained, for example, during discovery.

122. By at least the filing of the Complaint, Magna has knowledge of the existence of the '516 Patent and that one or more Magna products infringe at least one claim of the '516 Patent. Based on this knowledge, Magna has known that customers, distributors, suppliers, and other purchasers of the Accused Radar Products are infringing one or more claims of the '516 Patent, and Magna has intended to have these customers, distributors, suppliers, and other purchasers infringe one or more claims of the '516 Patent by instructing them to implement and use the Accused Radar Products in a manner that Magna knows to infringe such claims.

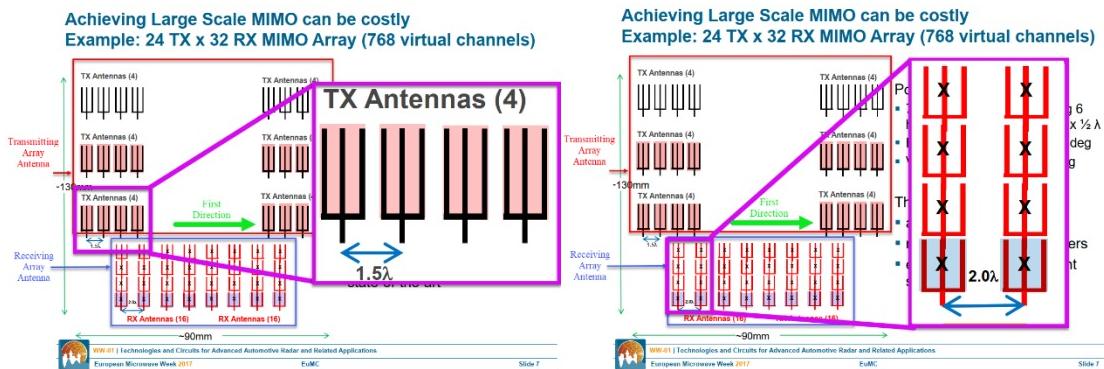
123. The Accused Radar Products meet all the limitations of at least claim 1 of the '516 Patent in violation of 35 U.S.C. § 271(a).

124. On information and belief, the Accused Radar Products comprise a radar device comprising a transmitting array antenna, a receiving array antenna, a radar transmission circuitry which, in operation, transmits a radar signal through the transmitting array antenna; and a radar reception circuitry which, in operation, receives a reflected wave signal through the receiving array

antenna, wherein the reflected wave signal is the radar signal reflected by an object. *See e.g.* Ex. 24.

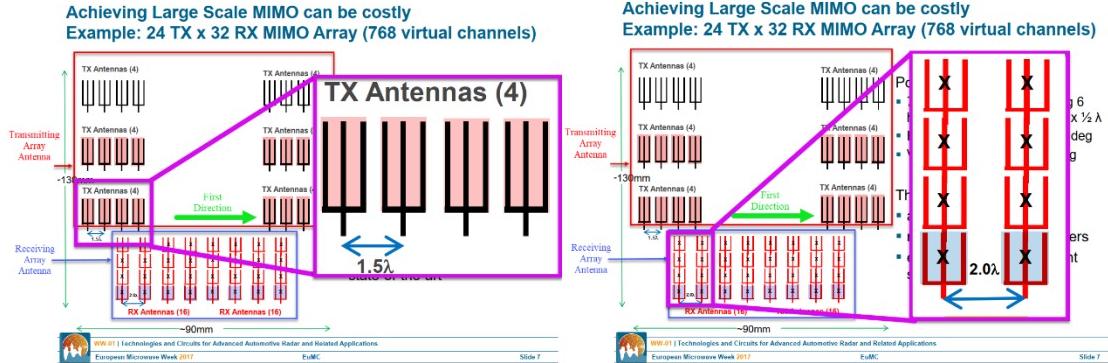
125. On information and belief, the Accused Radar Products' transmitting array antenna includes a plurality of transmitting antennas, and the receiving array antenna includes a plurality of receiving antennas, where the transmitting antennas are linearly arranged in a first direction, and the receiving antennas are linearly arranged in the first direction. *See e.g.* Ex. 24.

126. On information and belief, the transmitting antenna pitch of the transmitting array antenna for the Accused Radar Products' in the first direction is larger than 1 wavelength, and a receiving antenna pitch of the receiving array antenna in the first direction is larger than 1 wavelength.



See, e.g., Ex. 24.

127. On information and belief, an absolute value of a difference between the transmitting antenna pitch of the transmitting array antenna and the receiving antenna pitch of the receiving array antenna in the first direction is not smaller than 0.5 wavelength and not larger than 0.75 wavelength.



See e.g. Ex. 24.

128. In addition to directly infringing the '516 Patent, Defendant has infringed and continues to infringe the '516 Patent indirectly, including by actively inducing others to directly infringe the '516 Patent in violation of 35 U.S.C. § 271(b).

129. Defendant has had knowledge of the '516 Patent since at least the filing of this complaint. Despite Defendant's knowledge of the '516 Patent, Defendant is actively inducing and continues to actively induce others to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, Accused Radar Products in a manner that infringes one or more claims of the '516 Patent. Such Accused Radar Products include for example the Magna and Uhnder ICON radar system.

130. For example, in addition to Defendant's own direct infringement of the '516 Patent, Defendant's customers, including automotive OEMs, on information and belief, are directly infringing the '516 Patent through their use of Accused Radar Products that are covered by one or more claims of the '516 Patent, including, for example, the ICON radar system Magna is co-developing with Uhnder.

131. This description is based on publicly available information and a reasonable investigation of the structure and operation of the Accused Radar Products. Panasonic reserves the

right to modify this description, including, for example, on the basis of information about the Accused Radar Products that it obtains during discovery.

132. Unless and until enjoined by this Court, Defendant will continue to infringe the '516 Patent, both directly and indirectly. Defendant's infringement is causing and will continue to cause Plaintiff irreparable harm, for which there is no adequate remedy at law.

133. Under 35 U.S.C. § 283, Plaintiff is entitled to a permanent injunction against further infringement.

134. If not entitled to a permanent injunction, under 35 U.S.C. § 284, Plaintiff is entitled to damages adequate to compensate it for Defendant's infringement, in no event less than a reasonable royalty for Defendant's use of the inventions of the '184 Patent, together with interest and costs as fixed by the court.

PRAAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully requests that the Court enter judgment in favor of Plaintiff and prays that the Court grant the following relief to Plaintiff:

A. Ruling that Defendant has infringed one or more of the Asserted Patents, directly and indirectly, by way of inducement or contributory infringement, literally or under the doctrine of equivalents;

B. Permanently enjoining Defendant and all affiliates, employees, agents, officers, directors, attorneys, successors, and assigns and all those acting in privity, on behalf, or in concert with it, from directly or indirectly infringing any of the claims of the Asserted Patents, and from causing or encouraging others to directly infringe the Asserted Patents, including without limitation the Accused Products, until after the expiration date of the Asserted Patents, including any extensions and/or additional periods of exclusivity to which Plaintiff is or becomes entitled;

C. Awarding damages under 35 U.S.C. § 284 in an amount sufficient to compensate Plaintiff for its damages arising from Defendant's direct and indirect infringement of the Asserted Patents, including, but not limited to, lost profits and/or a reasonable royalty, together with pre-judgment and post-judgment interest, and costs;

D. Awarding an accounting and/or supplemental damages for all damages occurring after any discovery cutoff and through the Court's decision regarding the imposition of a permanent injunction;

E. Declaring this case to be exceptional within the meaning of 35 U.S.C. § 285 and awarding Plaintiff the attorney fees, costs, and expenses it incurs in this action;

G. Awarding Plaintiff such other and further relief as the Court deems just and proper.

JURY DEMAND

In accordance with Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff Panasonic hereby demands a trial by jury for all issues so triable.

DATED: March 31, 2021

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